International Journal of Natural and Health Sciences (IJNHS)
Vol.4, No.4, 2026: 667-690

Physiotherapy Across the Continuum of Care: Clinical Contributions, Health-System Integration, and Sustainable Rehabilitation - A Review

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A R T I C L E I N F O

Keywords: Physiotherapy, Physical Therapy, Rehabilitation, Health Systems, Therapeutic Exercise, Primary Care, Telerehabilitation, Community-Based Rehabilitation, Functional Recovery, Patient-Centred Care

Received : 5 August
Revised : 20 September
Accepted : 20 October

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A B S T R A C T

Physiotherapy has expanded from a predominantly post-injury service into a health-system function spanning prevention, primary care, acute recovery, chronic disease management, community rehabilitation, healthy ageing, and digital care. This qualitative literature review critically synthesises recent evidence on the clinical, organisational, technological, ethical, and contextual dimensions that shape this expanded role. Peer-reviewed literature published primarily between 2020 and 2026 was purposively identified and interpreted through a narrative-integrative approach rather than a systematic review framework. The synthesis indicates that physiotherapy contributes most consistently by improving human functioning, including mobility, activity, independence, participation, self-management, and quality of life. Evidence is particularly strong for exercise-based musculoskeletal care, task-specific neurological rehabilitation, pulmonary rehabilitation, fall prevention, and selected home-based or telerehabilitation pathways. At the health-system level, direct access, first-contact physiotherapy, advanced-practice roles, community rehabilitation, and hybrid digital models may improve accessibility, continuity, and efficiency when supported by appropriate regulation, financing, workforce capability, referral pathways, and interprofessional collaboration. However, benefits are context-dependent and may be limited by inequitable service distribution, workforce shortages, digital exclusion, and fragmented care

DOI: https://doi.org/10.59890/ijnhs.v4i4.13
E-ISSN: 3025-9665
https://journalijnhs.my.id/index.php/ijnhs/index

INTRODUCTION

Rehabilitation is increasingly recognised as an essential component of contemporary health systems rather than an optional service reserved for a small group of people after major injury or surgery. Global estimates based on the Global Burden of Disease Study 2019 indicate that approximately 2.41 billion people were living with health conditions that could benefit from rehabilitation, representing roughly one in three people worldwide; musculoskeletal disorders accounted for the largest share of this need. Population ageing, the growing prevalence of non-communicable diseases, and improved survival after acute illness and injury are therefore increasing demand for services that restore, maintain, and optimise functioning across the life course (Cieza et al., 2020; Jesus et al., 2021).

Within this broader rehabilitation agenda, physiotherapy—also termed physical therapy in some jurisdictions—has a distinctive role because it combines movement science, therapeutic exercise, functional training, education, behavioural support, and selected manual or technology-assisted interventions to improve mobility, participation, independence, and quality of life. Contemporary physiotherapy is no longer confined to post-injury recovery; it increasingly extends into primary care, chronic disease management, prevention, community rehabilitation, advanced practice, and direct-access models in which appropriately trained physiotherapists act as first-contact practitioners for selected musculoskeletal presentations (Tawiah et al., 2021; Igwesi-Chidobe et al., 2021; Stynes et al., 2021).

The urgency of strengthening physiotherapy is especially evident in populations living with chronic disease and multimorbidity. Functional limitations frequently emerge from the interaction of musculoskeletal, cardiovascular, respiratory, neurological, and metabolic conditions, and these limitations can restrict participation even when the underlying diseases are medically stable. Evidence from exercise-rehabilitation research indicates that structured rehabilitation can improve exercise capacity and health-related quality of life among people with multimorbidity, reinforcing the importance of physiotherapists in helping patients translate medical stability into practical functioning and sustained participation in daily life (Barker et al., 2023; Cieza et al., 2020).

Physiotherapy is also central to rehabilitation after high-burden disabling conditions. Stroke provides a clear example: effective rehabilitation requires task-specific training, mobility restoration, balance retraining, prevention of secondary complications, and long-term support for participation, yet access to high-quality stroke rehabilitation remains uneven, particularly in low- and middle-income countries. Similar health-system pressures are evident in common musculoskeletal disorders, where physiotherapist-led assessment and management can provide clinically appropriate alternatives to physician-first pathways for selected patients and may reduce unnecessary imaging or consultations when implemented within clear referral and escalation structures (Bernhardt et al., 2020; Ho-Henriksson et al., 2022).

From a health-system perspective, the value of physiotherapy extends beyond individual clinical outcomes. Direct-access and advanced-practice physiotherapy models have been developed to improve access to musculoskeletal care, reduce pressure on general practitioners and specialist services, and potentially improve the allocation of health-care resources. Economic and service evaluations suggest that such models can be acceptable to patients and professionals and may offer cost or efficiency advantages, although their success depends on workforce competence, communication between professions, adequate capacity, governance, and clarity regarding the scope of practice (Yang et al., 2021; Lafrance et al., 2021; Goodwin et al., 2021; Igwesi-Chidobe et al., 2021).

Digital transformation has further expanded the possible reach of physiotherapy. Telerehabilitation and video-based physiotherapy became especially prominent during the COVID-19 pandemic, but subsequent evidence has shown that remote rehabilitation can remain clinically useful beyond emergency conditions. Reviews have reported outcomes that are often comparable with face-to-face rehabilitation for selected neurological, cardiorespiratory, and musculoskeletal populations, while patients and physiotherapists have generally reported positive experiences with videoconference-based care. At the same time, safe implementation requires attention to digital literacy, movement assessment, privacy, technology access, patient selection, and escalation pathways, meaning that digital delivery should complement rather than indiscriminately replace in-person care (Seron et al., 2021; Suso-Marti et al., 2021; Bennell et al., 2021; Anil et al., 2021).

These issues are particularly relevant to Indonesia, where geographical dispersion, unequal distribution of rehabilitation resources, and variation in service availability can complicate continuity of care. A study of community-based rehabilitation services in Bandung, Tanah Datar, and Gowa demonstrated that rehabilitation can be organised outside hospitals and, in some settings, integrated with primary health-care centres, illustrating the importance of community-oriented models for improving access. The COVID-19 period also demonstrated the vulnerability of face-to-face physiotherapy access in Indonesia, with reduced visits among people with knee osteoarthritis during periods of disruption, further supporting the need for resilient, community-linked, and digitally enabled rehabilitation pathways (Nugraha et al., 2021; Aras et al., 2022).

Despite the breadth of contemporary physiotherapy, the literature remains fragmented across clinical specialties, intervention types, service-delivery models, and technological platforms. Studies may demonstrate effectiveness for a particular intervention or condition without explaining how physiotherapy should be positioned across the continuum from prevention and primary care to acute, post-acute, community, and long-term rehabilitation. A broader qualitative synthesis is therefore needed to connect clinical effectiveness with accessibility, workforce roles, technological change, ethical practice, patient-centredness, and health-system efficiency, particularly for settings in which rehabilitation resources are constrained or unevenly distributed (Cieza et al., 2020; Tawiah et al., 2021; Anil et al., 2021).

Accordingly, this article addresses two research questions. RQ1 asks: How does contemporary physiotherapy contribute to prevention, functional recovery, chronic disease management, rehabilitation, and health-system performance across different populations and care settings? RQ2 asks: What clinical, organisational, technological, ethical, and contextual factors determine whether physiotherapy services can be delivered effectively, accessibly, and sustainably within modern rehabilitation systems?

The purpose of this article is to critically synthesise recent literature on the role of physiotherapy in health systems and rehabilitation, with particular attention to its clinical scope, contribution to functional outcomes and quality of life, integration with primary and community care, advanced-practice and direct-access models, digital rehabilitation, and the professional competencies required for safe and effective care. The review also aims to identify implementation challenges and future priorities relevant to strengthening physiotherapy as an evidence-informed, patient-centred, and system-integrated component of rehabilitation, including implications for Indonesia and other resource-diverse health systems.

LITERATURE REVIEW

Physiotherapy as a Rehabilitation Science Focused on Human Functioning

Contemporary physiotherapy is best understood not merely as a collection of physical modalities but as a rehabilitation profession concerned with human functioning. Its clinical object extends from impairments in body structures and functions to activity limitations, participation restrictions, and the environmental or personal factors that shape everyday performance. This orientation is consistent with the International Classification of Functioning, Disability and Health (ICF), which reframes health outcomes around what people can do, how they participate in valued life roles, and how contextual conditions enable or restrict recovery. Such a framework is particularly relevant to physiotherapy because movement, mobility, endurance, balance, task performance, and participation are simultaneously biological and social phenomena. Consequently, physiotherapy assessment should connect impairment-level findings to patient-defined goals and participation outcomes rather than treating range of motion, muscle force, or pain intensity as sufficient endpoints in isolation (Bickenbach, 2021; Maart and Sykes, 2022).

The ICF-informed view also provides a conceptual bridge between individual rehabilitation and health-system planning. Rehabilitation needs are heterogeneous across musculoskeletal, neurological, cardiopulmonary, paediatric, geriatric, and multimorbidity populations, but the common objective is to optimise functioning in real environments. Contemporary rehabilitation scholarship therefore emphasises goal setting, outcome measurement, contextual adaptation, and repeated reassessment. For physiotherapy, this implies a clinical reasoning cycle in which the therapist identifies functional problems, selects interventions with plausible mechanisms, monitors progress, and modifies treatment according to response and patient priorities. Evidence-based decision models in rehabilitation similarly integrate research evidence with clinical

expertise, the person's preferences, family support, service availability, and environmental constraints (Novak et al., 2021; Cieza et al., 2020).

Biopsychosocial and Person-Centred Foundations

A second conceptual foundation is the biopsychosocial perspective. Persistent pain, disability, and long-term functional limitation are rarely explained adequately by tissue pathology alone; they are influenced by beliefs, emotions, behavioural responses, sleep, work demands, family support, socioeconomic conditions, and previous health experiences. In musculoskeletal rehabilitation, this perspective has encouraged physiotherapists to move beyond narrowly biomechanical explanations towards high-value care that links physical assessment with psychosocial screening, education, self-management, and graded activity. However, implementing a biopsychosocial model remains challenging because clinicians may lack confidence, time, organisational support, or training in addressing psychosocial contributors. A recent scoping review found that physiotherapists report both professional and system-level barriers to using this model consistently in chronic pain care (van Dijk et al., 2023; Hutting et al., 2022).

Person-centred practice operationalises this broader perspective by treating the patient as an active partner in rehabilitation. Meaningful connection, collaborative goal setting, shared decision making, and self-management support are repeatedly identified as central elements. Qualitative synthesis shows that both patients and physiotherapists value being treated as a unique person, high-quality communication, professional credibility, and support for empowerment. Shared decision making is therefore not an optional communication technique but part of evidence-based physiotherapy because intervention choices should reflect both best available evidence and the values, preferences, circumstances, and tolerance for risk of the person receiving care. This is especially important when several reasonable options exist, as is common in chronic musculoskeletal rehabilitation (Hoffmann, Lewis and Maher, 2020; Naylor, Killingback and Green, 2023).

Therapeutic Relationship, Communication, and Behavioural Change

The therapeutic relationship is a mechanism through which technical interventions are translated into engagement and adherence. Physiotherapy frequently requires repeated sessions, behaviour change, progressive loading, home exercise, and tolerance of temporary discomfort; these processes depend on trust and a shared understanding of goals. Research on low back pain rehabilitation indicates that physiotherapists view therapeutic alliance as closely connected to listening, individualisation, explanation, credibility, and the capacity to integrate psychosocial concerns into a physical treatment encounter. The alliance therefore complements rather than replaces technical expertise. It can influence whether patients persist with rehabilitation, disclose barriers, and interpret symptoms in ways that support rather than undermine activity (Unsgaard-Tondel and Soderstrom, 2022; Hutting et al., 2022).

Education is also increasingly viewed as a behavioural intervention rather than simple transfer of information. In chronic pain, pain neuroscience education aims to modify maladaptive beliefs, threat interpretations, and fear-related behaviour by explaining pain as a multidimensional experience. Meta-analytic evidence suggests that pain neuroscience education can improve some pain-related outcomes, particularly when integrated with active rehabilitation rather than delivered as an isolated intervention. The implication for physiotherapy is that explanation, reassurance, and self-management education should be linked to graded movement and functional practice, with content tailored to the person's health literacy and context (Romm et al., 2021; Watson et al., 2021).

Therapeutic Exercise and Movement-Based Rehabilitation

Therapeutic exercise is a central intervention across physiotherapy because many rehabilitation goals require repeated, appropriately dosed exposure to movement. Exercise may target strength, endurance, flexibility, balance, motor control, cardiovascular capacity, or task-specific performance, but its therapeutic value depends on prescription rather than the generic instruction to be active. Dose, progression, specificity, adherence, symptom response, baseline capacity, and patient preference all influence outcomes. In chronic low back pain, a major Cochrane review concluded that exercise therapy is probably effective for pain compared with no treatment, usual care, or placebo, although average effects on functional limitation are often modest and programmes are heterogeneous. This reinforces a key theoretical principle: exercise should be individualised and embedded within a broader rehabilitation strategy rather than treated as a uniform product (Hayden et al., 2021).

Exercise also illustrates the preventive and chronic-disease functions of physiotherapy. In people with multimorbidity, structured exercise rehabilitation can address deconditioning, reduced physical capacity, and activity restriction across diagnostic boundaries. Cardiac rehabilitation provides an example in which exercise training is combined with behaviour change to support sustained physical activity after cardiovascular events, while pulmonary rehabilitation improves exercise capacity, dyspnoea, and quality of life in chronic obstructive pulmonary disease. These findings support a view of physiotherapy as both restorative and preventive: the intervention is not only intended to reverse impairment but also to reduce secondary disability and support long-term participation in health-promoting activity (Barker et al., 2023; Meiring, Tanimukai and Bradnam, 2020; Zhang et al., 2022).

Manual Therapy and Adjunct Physical Modalities within Multimodal Care

Manual therapy remains an established component of musculoskeletal physiotherapy, including joint mobilisation, manipulation, and soft-tissue techniques. Contemporary evidence, however, favours a contextual and multimodal interpretation rather than the assumption that passive techniques alone correct a single mechanical lesion. Systematic review evidence in knee osteoarthritis suggests that manual therapy can contribute to improvements in pain and function, but the clinical role of such interventions is strongest when they are integrated with exercise, education, and self-management. The

conceptual emphasis therefore shifts from passive 'correction' towards short-term symptom modulation that may enable movement, participation, and progression of active rehabilitation (Tsokanos et al., 2021).

The same reasoning applies to electrophysical and other adjunctive modalities. Their value should be judged according to evidence for a defined indication, magnitude and duration of benefit, safety, cost, and whether they facilitate meaningful functional gains. Rehabilitation decision-making frameworks explicitly discourage routine continuation of ineffective or outdated interventions and emphasise choosing an evidence-supported mode and dose, reviewing response, and discontinuing components that do not contribute to patient goals. This approach places adjunctive techniques within an evidence-based hierarchy in which active rehabilitation, patient education, goal-directed practice, and functional progression remain central (Novak et al., 2021; Zadro et al., 2020).

Neurological Rehabilitation, Motor Learning, and Neuroplasticity

Neurological physiotherapy is grounded in the interaction between motor control, motor learning, task practice, and neuroplasticity. Recovery after stroke or other neurological injury is not achieved simply by increasing muscle strength; it involves repeated practice of meaningful actions, sensory feedback, adaptation to task and environmental constraints, and remediation or compensation for specific movement deficits. Contemporary motor-learning theory supports task specificity and carefully structured practice, while recognising that the optimal learning conditions vary according to impairment severity, cognitive capacity, feedback needs, fatigue, and the stage of recovery. Reviews of motor learning in neurological rehabilitation therefore recommend linking theory to individual motor deficits rather than applying generic movement protocols (Levin and Demers, 2021; Gregor et al., 2021).

This conceptual foundation has important implications for stroke rehabilitation in resource-constrained settings. High-quality recovery requires sufficient therapy intensity, coordinated interdisciplinary care, access to appropriate technologies where useful, and continuity after discharge. In low- and middle-income countries, gaps in rehabilitation infrastructure, workforce, and service access can restrict the translation of evidence-based neurological rehabilitation into practice. Physiotherapy thus operates simultaneously at the level of neural recovery and the level of service organisation: effective motor practice is necessary, but it cannot be delivered consistently without rehabilitation capacity and accessible pathways of care (Bernhardt et al., 2020).

Physiotherapy Across the Life Course: Paediatric and Geriatric Perspectives

Paediatric physiotherapy requires a developmental and family-centred perspective because motor performance emerges through interactions among the child, task, family, and environment. In cerebral palsy, exercise interventions can improve specific outcomes such as strength and gait speed, although effects on gross motor function are not uniformly large across trials. This variability illustrates why rehabilitation goals should be developmentally appropriate and

participation-oriented rather than limited to isolated impairment measures. Family involvement is also central because carryover into home, school, and community settings influences the amount and relevance of practice (Liang et al., 2021).

At the other end of the life course, geriatric physiotherapy frequently addresses mobility decline, sarcopenia, balance impairment, multimorbidity, and fall risk. Fall-prevention guidelines commonly recommend risk stratification, multifactorial assessment, exercise, environmental modification, and referral to physiotherapy where indicated. The theoretical implication is that older-adult rehabilitation should combine physical capacity training with management of interacting risks such as medication, vision, footwear, cognition, and environmental hazards. Maintaining independence is therefore a multidimensional rehabilitation goal that depends on both physical intervention and coordination with broader geriatric care (Montero-Odasso et al., 2021).

Community-Based Rehabilitation and Health-System Integration

Physiotherapy increasingly extends beyond hospitals and outpatient clinics into primary care, workplaces, homes, and community settings. This shift is important because chronic disability and rehabilitation needs persist long after acute medical treatment has ended. Community-based rehabilitation can improve continuity, reduce travel burden, support family involvement, and connect functional goals with real living environments. In Indonesia, mapping of community-based rehabilitation services has shown substantial variation in organisation, target groups, human resources, and service processes, highlighting both the value of community delivery and the need for stronger standardisation and system integration (Nugraha et al., 2021).

Primary-care models also demonstrate how physiotherapy can influence health-system efficiency. First-contact and direct-access physiotherapy allow appropriately selected patients with musculoskeletal problems to be assessed without requiring an initial physician consultation, while advanced-practice roles may include expanded assessment and referral responsibilities. Evaluations from health systems where these models are established suggest potential benefits for access, patient flow, and resource use, although implementation depends on professional scope, workforce competence, interprofessional trust, governance, and financing. Physiotherapy should therefore be conceptualised as a component of integrated health-system design rather than only a downstream rehabilitation service (Goodwin et al., 2021; Stynes et al., 2021; Lafrance et al., 2021; Tawiah et al., 2021).

Digital Physiotherapy and Telerehabilitation

Digital delivery has expanded the spatial reach of physiotherapy through video consultations, remote exercise supervision, digital education, wearable monitoring, and hybrid rehabilitation. Reviews published after the COVID-19 transition indicate that telerehabilitation can be effective for selected populations and outcomes, while patients and physiotherapists often report positive experiences when technology is reliable and the clinical task is suitable for remote management. However, equivalence cannot be assumed for every condition or

every component of assessment. Safety, privacy, digital literacy, internet access, caregiver support, and the need for hands-on examination must be considered when determining whether remote, in-person, or hybrid care is appropriate (Seron et al., 2021; Suso-Marti et al., 2021; Bennell et al., 2021).

Telerehabilitation also raises a broader equity question. Digital platforms may reduce geographic barriers and travel costs, but they can simultaneously exclude people with limited connectivity, devices, digital confidence, or private space. Guidance reviews therefore emphasise that telerehabilitation should be supported by clear standards for clinical suitability, risk management, outcome monitoring, confidentiality, and escalation to in-person care. In countries with uneven rehabilitation infrastructure, digital physiotherapy is best understood as one component of a diversified service model rather than a replacement for face-to-face rehabilitation (Anil et al., 2021; Aras, Tang and Ahmad, 2022).

Evidence-Based Practice, Ethical Competence, and Professional Capability

Evidence-based physiotherapy requires more than knowledge of published research. Clinicians must integrate research evidence with clinical expertise, patient values, available resources, and the feasibility of delivering the chosen intervention. Studies of early-career physiotherapists indicate that confidence in evidence-based practice can decline after entry into the workforce as time pressure, workplace culture, patient expectations, and access to resources compete with idealised decision-making processes. Systematic review evidence also shows that implementation strategies can improve alignment with clinical practice guidelines, but sustained change requires more than dissemination of recommendations. Organisational culture, audit and feedback, leadership, and accessible evidence are important implementation conditions (McEvoy et al., 2020; Zadro et al., 2020).

Professional competence also has an ethical dimension. Physiotherapists make decisions that affect pain, mobility, independence, risk, cost, and access to care; competence therefore includes awareness of professional limits, informed consent, confidentiality, respect for autonomy, justice, and the ability to recognise situations requiring referral or interprofessional collaboration. A national Finnish study identified ethical awareness, moral reasoning, and commitment to good practice as components of ethical competence in physiotherapy. In practical terms, safe physiotherapy requires technical skill to be combined with transparent communication, respect for patient preferences, equitable care, and continuous professional development (Kulju et al., 2020; Hoffmann, Lewis and Maher, 2020).

Conceptual Synthesis for Analysing the Role of Physiotherapy

Taken together, the literature supports a layered conceptualisation of physiotherapy. At the first layer are mechanisms of human functioning: movement, strength, endurance, balance, motor control, pain, and participation. At the second are intervention mechanisms: therapeutic exercise, task practice, education, behavioural change, manual techniques, and technology-enabled rehabilitation. At the third are relational and decision processes: therapeutic

alliance, person-centred goal setting, shared decision making, and self-management support. The fourth layer concerns implementation within health systems: workforce capability, interprofessional coordination, financing, direct access, community delivery, digital infrastructure, and ethical governance. Outcomes should consequently be evaluated not only through impairment measures but through activity, participation, quality of life, independence, service access, and sustainability (Bickenbach, 2021; Maart and Sykes, 2022; Novak et al., 2021).

This synthesis provides the theoretical basis for the subsequent analysis in this article. It suggests that the contribution of physiotherapy cannot be reduced to the efficacy of a particular technique. Its value depends on whether evidence-based interventions are matched to patient-defined functional problems, delivered through a credible therapeutic relationship, adapted to context, and embedded within accessible rehabilitation pathways. The Results and Discussion section can therefore examine physiotherapy across clinical effectiveness, prevention and chronic disease management, rehabilitation outcomes, health-system efficiency, digital transformation, professional competence, and equity of access, thereby directly addressing the research questions formulated in the Introduction.

METHODOLOGY

This article used a qualitative literature review (QLR) with a narrative-integrative orientation to examine the contemporary role of physiotherapy in health systems and rehabilitation. This approach was selected because the research questions require conceptual interpretation and cross-context synthesis of heterogeneous evidence on clinical practice, rehabilitation, prevention, service delivery, digital care, professional competence, and health-system integration rather than estimation of a single pooled intervention effect. Narrative and integrative reviews can provide rigorous knowledge synthesis when their scope, boundaries, selection logic, and interpretive procedures are made explicit; accordingly, this review was designed as a critical and explanatory synthesis rather than a systematic literature review (Elsbach and van Knippenberg, 2020; Lubbe, ten Ham-Baloyi and Smit, 2020; Sukhera, 2022).

Literature identification was purposive and iterative. Searches focused primarily on peer-reviewed journal articles published from 2020 to 2026 in English or Indonesian and were conducted through major scholarly sources, including PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar, with DOI and publisher-page verification used to confirm bibliographic authenticity. Search concepts were combined around physiotherapy or physical therapy, rehabilitation, functioning and disability, therapeutic exercise, musculoskeletal and neurological rehabilitation, chronic disease, primary and community care, telerehabilitation, direct access, advanced practice, ethics, competence, and health-system performance. Sources were prioritised when they directly informed the article's research questions, clarified theoretical or conceptual foundations, represented contemporary empirical evidence, or provided implementation-relevant insights. The search was not intended to be exhaustive or PRISMA-based; instead, literature was sampled until the thematic

domains required for a sufficiently comprehensive and coherent synthesis were represented (Barry, Merkebu and Varpio, 2022; Sukhera, 2022).

Analysis proceeded through iterative thematic comparison and integrative synthesis. Evidence was organised around three linked analytical domains: (1) the clinical and rehabilitative contributions of physiotherapy to functional recovery, prevention, chronic-disease management, and quality of life; (2) the contribution of physiotherapy to service accessibility, continuity, multidisciplinary rehabilitation, and health-system efficiency; and (3) the organisational, technological, ethical, professional, and contextual conditions that enable or constrain effective implementation. Findings were compared across populations and care settings, interpreted in relation to the biopsychosocial and functioning-oriented foundations developed in the Literature Review, and then synthesised to answer the research questions and identify future priorities. Because the study is a QLR rather than a systematic review, no protocol registration, exhaustive study screening, formal risk-of-bias scoring, meta-analysis, or quantitative certainty grading was undertaken; methodological credibility instead rests on transparent scope definition, source verification, critical comparison, and explicit linkage between evidence, interpretation, and conclusions (Elsbach and van Knippenberg, 2020; Barry, Merkebu and Varpio, 2022).

RESULTS AND DISCUSSION

Physiotherapy as a Health-System and Rehabilitation Function

The literature synthesized in this qualitative review indicates that contemporary physiotherapy is best understood as a health-system function that operates across prevention, first-contact care, acute and post-acute rehabilitation, long-term condition management, community participation, and digitally supported care. This broader positioning is consistent with the global rehabilitation agenda, in which functioning is treated as a central health outcome alongside survival and disease control. The scale of unmet rehabilitation need further strengthens the case for embedding physiotherapy within mainstream health services rather than restricting it to post-injury referral pathways (Cieza et al., 2020; Jesus et al., 2021; Bickenbach, 2021). At the prevention and primary-care end of the continuum, physiotherapists contribute through physical-activity promotion, ergonomic and movement education, early assessment, conservative management, risk stratification, and referral when red flags or conditions outside scope are identified. Evidence on direct-access models suggests that physiotherapist-led first-contact pathways can achieve comparable or favourable patient outcomes while reducing some forms of healthcare utilisation and, in several settings, lowering costs or the number of treatment visits. More recent evidence also suggests that direct access may reduce medication prescribing, although certainty for some outcomes such as imaging remains limited (Demont et al., 2021; Hon et al., 2021; Cattrysse et al., 2024; Fischer et al., 2026). In acute and post-acute care, physiotherapy contributes to early mobilisation, restoration of movement, prevention of secondary disability, functional retraining, discharge preparation, and transition to home or community rehabilitation.

These functions become particularly important in stroke, cardiopulmonary disease, major musculoskeletal conditions, and multimorbidity, where recovery depends on coordinated and progressive rehabilitation rather than isolated treatment episodes. Advanced-practice physiotherapy can further extend this contribution when governance, training, diagnostic capability, and referral arrangements are clearly defined (Bernhardt et al., 2020; Barker et al., 2023; Tawiah et al., 2021; Lafrance et al., 2021). *Figure 1 summarizes this expanded role of physiotherapy across the health-system continuum and illustrates how value is generated by connecting prevention, first-contact care, rehabilitation, community services, and digital delivery rather than treating them as separate service silos.*



Figure 1. Physiotherapy Across the Health-System Continuum

As shown in Figure 1, the contribution of physiotherapy extends from reducing preventable functional decline to restoring function after illness or injury and sustaining participation over time. This continuum perspective shifts evaluation away from treatment volume alone and toward outcomes such as function, independence, participation, continuity of care, and health-system efficiency. It also highlights why referral pathways, community capacity, and digital infrastructure influence the real-world effectiveness of physiotherapy services (Cieza et al., 2020; Nugraha et al., 2021; Seron et al., 2021).

Clinical Effectiveness Across Major Physiotherapy Practice Domains

The evidence base is strongest when physiotherapy interventions are linked to clearly defined functional problems, condition-specific goals, and progressive treatment parameters. In musculoskeletal care, exercise therapy is supported for chronic low back pain, although average effects are generally modest and heterogeneity in exercise type, dose, and patient characteristics remains substantial. Manual therapy may provide symptom or mobility benefits in selected conditions such as knee osteoarthritis, but contemporary evidence supports its use mainly as an adjunct to active rehabilitation, education, and self-management rather than as a stand-alone mechanism of recovery (Hayden et al., 2021; Tsokanos et al., 2021; Hutting et al., 2022). Neurological rehabilitation illustrates the importance of task specificity, repetition, motor learning, and meaningful activity. After stroke, physical therapy-based rehabilitation can improve upper-limb motor outcomes, and systematic reviews favour task-

specific training over approaches that are less directly linked to functional activity. Home-based exercise can achieve motor and activity outcomes that are similar to centre-based programs for some stroke populations, suggesting that location of care may be flexible when intervention quality, progression, and monitoring are preserved (Huang et al., 2022; Dorsch et al., 2023; Nascimento et al., 2022; Levin and Demers, 2021). Cardiopulmonary rehabilitation provides another strong example of physiotherapy's multidimensional contribution. Pulmonary rehabilitation for chronic obstructive pulmonary disease improves exercise capacity, dyspnoea, and quality-of-life outcomes, while economic evaluations indicate that respiratory physiotherapy interventions centred on exercise training and physical-activity enhancement are often cost-effective. Home-based pulmonary rehabilitation can also be effective, which is particularly relevant where travel, geography, workforce availability, or facility capacity constrain access (Zhang et al., 2022; Leemans et al., 2021; Stafinski et al., 2022).

For older adults, physiotherapy has a central role in fall prevention, balance, mobility, strength, and maintenance of independence. Contemporary fall-prevention guidelines consistently include exercise, physiotherapy referral, multifactorial assessment, and environmental modification among core strategies. In paediatric rehabilitation, including cerebral palsy, exercise-based interventions can improve selected functional outcomes, but effects vary across domains and reinforce the need to align intervention goals with development, family priorities, and participation rather than focusing only on impairment measures (Montero-Odasso et al., 2021; Liang et al., 2021). Physiotherapy also intersects with mental health and well-being through structured physical activity, confidence building, social participation, and management of persistent pain or disability. Exercise has evidence as a treatment component for depression, while pain neuroscience education and therapeutic alliance may influence self-efficacy, symptom interpretation, and engagement among people with chronic musculoskeletal pain. This reinforces a biopsychosocial interpretation of physiotherapy outcomes rather than a narrow focus on tissue impairment (Davis and McGrane, 2021; Watson et al., 2021; Unsgaard-Tondel and Soderstrom, 2022; van Dijk et al., 2023). *Figure 2 maps these major evidence domains and emphasizes that physiotherapy effectiveness is condition-sensitive and depends on intervention selection, therapeutic dose, progression, adherence, and coordination with other health professionals.*

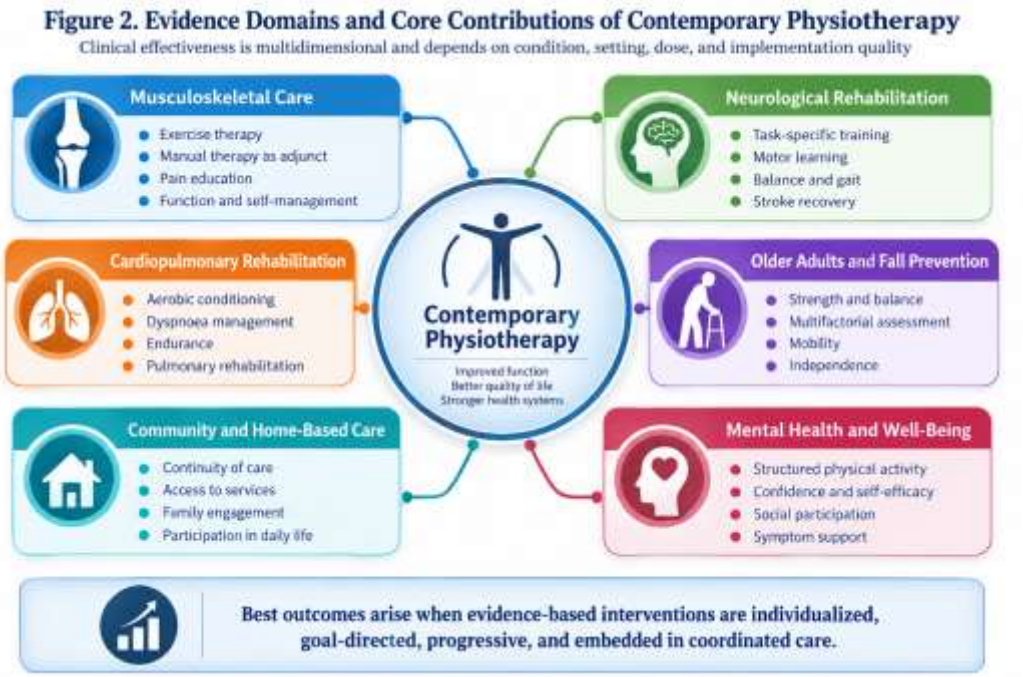


Figure 2. Evidence Domains and Core Contributions of Contemporary Physiotherapy

Figure 2 demonstrates that the common denominator across physiotherapy specialties is not a single technique but a functional, goal-oriented process that combines assessment, movement-based intervention, education, progression, and outcome monitoring. The implication is that high-quality physiotherapy is defined less by a fixed modality and more by the appropriateness of the intervention for the patient's condition, goals, context, and capacity for self-management (Novak et al., 2021; Naylor et al., 2023).

Access, Primary Care, and Advanced Practice

A major contemporary development is the expansion of physiotherapists' role in primary care through direct access, first-contact physiotherapy, and advanced-practice models. These models are intended to shorten pathways, provide earlier conservative management, and reduce unnecessary use of physician appointments, imaging, or medication. Evidence from health-service evaluations indicates that direct-access pathways can be acceptable to patients and clinicians and may improve efficiency, although implementation depends on public awareness, professional trust, referral arrangements, regulatory scope, and the availability of sufficiently trained physiotherapists (Igwesi-Chidobe et al., 2021; Goodwin et al., 2021; Stynes et al., 2021; Cattrysse et al., 2024). Economic evidence is particularly relevant to health-system decision making. Meta-analytic and economic-evaluation studies suggest potential cost advantages for direct-access and advanced-practice physiotherapy in selected musculoskeletal pathways. However, the value proposition should not be reduced to cost savings: safe implementation also requires diagnostic reasoning, clear escalation pathways, interprofessional communication, accountability, and mechanisms for identifying patients who require medical or surgical evaluation (Hon et al., 2021;

Lafrance et al., 2021; Ho-Henriksson et al., 2022). For Indonesia and other settings with uneven geographic distribution of rehabilitation services, the primary-care question is closely linked to workforce and service design. Community-based rehabilitation can connect rehabilitation to local participation and everyday functioning, but it requires coordination across health, social, family, and community systems. Indonesian service mapping has shown that community-based rehabilitation is already present in different forms, providing a foundation for strengthening referral, continuity, and local adaptation rather than relying exclusively on hospital-centred delivery (Nugraha et al., 2021).

Community, Home-Based, and Digital Rehabilitation

Home-based and community rehabilitation are important because many rehabilitation goals are ultimately expressed in everyday environments rather than in clinics. Evidence from stroke rehabilitation suggests that appropriately prescribed home-based exercise can achieve outcomes similar to centre-based rehabilitation for selected upper-limb outcomes. In COPD, home-based pulmonary rehabilitation can improve access where conventional programs are unavailable or difficult to attend. These findings support a shift from assuming that care quality is determined by location to evaluating whether the intervention is appropriately prescribed, monitored, progressed, and supported (Nascimento et al., 2022; Stafinski et al., 2022). Digital rehabilitation expands this logic further. Reviews of telerehabilitation in physical therapist practice show that remotely delivered rehabilitation can be effective across a range of conditions, and stroke-specific evidence indicates that functional outcomes and adherence can be comparable to face-to-face rehabilitation in some contexts. During and after COVID-19, telerehabilitation also demonstrated benefits for physical function and dyspnoea among people with COVID-19 or post-COVID conditions, although evidence certainty and population selection remain important considerations (Seron et al., 2021; Suso-Marti et al., 2021; Vieira et al., 2022; Sharififar et al., 2023). Digital care should therefore be treated as an additional mode of service delivery rather than a universal replacement for in-person physiotherapy. Safe digital practice requires reliable connectivity, patient digital literacy, privacy protection, appropriate remote assessment, escalation procedures, and recognition that some impairments or risks require hands-on examination. Positive patient and physiotherapist experiences with telehealth reinforce its potential, but the digital divide can reproduce existing inequities if technology access and health literacy are ignored (Bennell et al., 2021; Anil et al., 2021; Fryer et al., 2021).

Ethics, Professional Competence, and Implementation Conditions

The effectiveness of physiotherapy is constrained when clinical evidence is not matched by implementation capacity. Evidence-based practice requires access to research, skills in appraisal and clinical reasoning, organisational support, and the ability to integrate evidence with patient preferences and context. Studies of physiotherapists have shown that workplace culture, workload, education, and implementation strategies influence the uptake of

guideline-consistent care, while shared decision making remains essential to align intervention choices with what matters to patients (McEvoy et al., 2020; Zadro et al., 2020; Hoffmann et al., 2020). Ethical competence is similarly inseparable from quality. Physiotherapists face issues involving autonomy, informed consent, confidentiality, fairness, resource scarcity, professional boundaries, and access to care. International evidence indicates that scarce resources and unequal access are among the most frequently reported ethical challenges, suggesting that ethical practice cannot be reduced to individual behaviour alone; health-system design, financing, geography, and interprofessional relationships also shape what care can be delivered (Kulju et al., 2020; Fryer et al., 2021). *Figure 3 summarizes the principal facilitators and barriers that determine whether evidence-based physiotherapy can be implemented at scale. These factors operate simultaneously at clinician, organisational, technological, financing, policy, and community levels.*

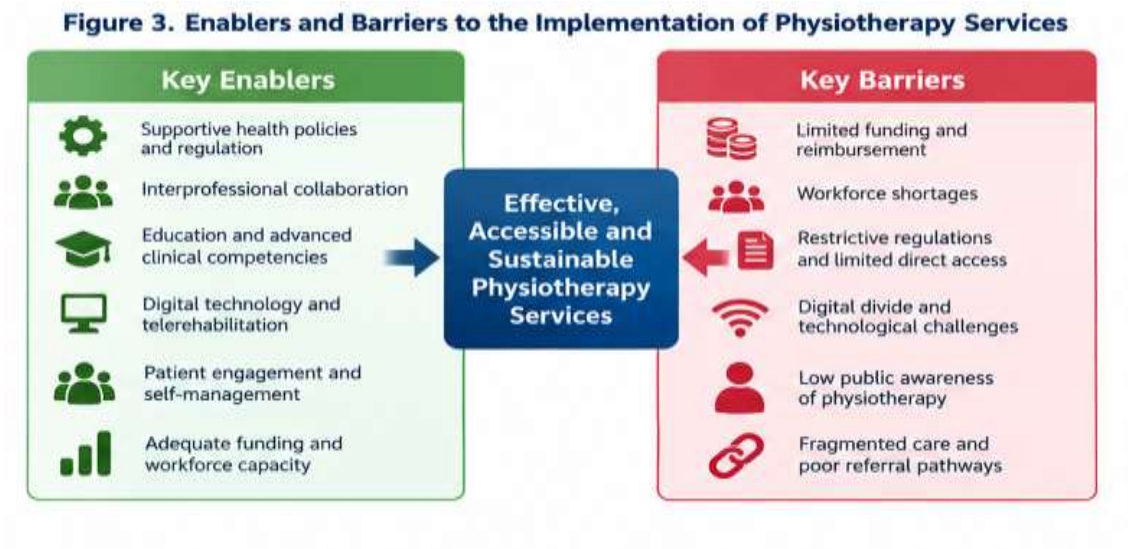


Figure 3. Enablers and Barriers to the Implementation of Physiotherapy Services

Figure 3 highlights that sustainable physiotherapy services require more than an adequate number of clinicians. Implementation is strengthened by supportive policy, interprofessional collaboration, advanced competence, patient engagement, digital infrastructure, and stable funding, whereas workforce shortages, restrictive regulations, fragmented referral systems, limited awareness, and technological inequities may reduce access or continuity. These observations are consistent with research on advanced practice, direct access, ethics, and rehabilitation-service implementation (Tawiah et al., 2021; Fryer et al., 2021; Cattrysse et al., 2024; Fischer et al., 2026).

Toward an Integrated and Sustainable Physiotherapy Service Model

The synthesis suggests that the future development of physiotherapy should integrate five interdependent dimensions: people, process, technology, policy, and place. The people dimension concerns patient-centred communication, shared decision making, therapeutic alliance, and equitable

access. Process concerns evidence-based assessment, goal setting, intervention, progression, referral, and evaluation. Technology includes telerehabilitation, remote monitoring, and other digital tools that extend rather than replace professional reasoning. Policy includes financing, regulation, scope of practice, workforce planning, and governance. Place refers to the community, home, clinic, hospital, workplace, school, and other environments in which functioning and participation occur. This integrated perspective is visualised in Figure 4. It positions sustainable physiotherapy services not as a collection of isolated modalities, but as a coordinated system designed to improve functioning, participation, quality of life, and health-system performance while remaining adaptable to local needs and resources.

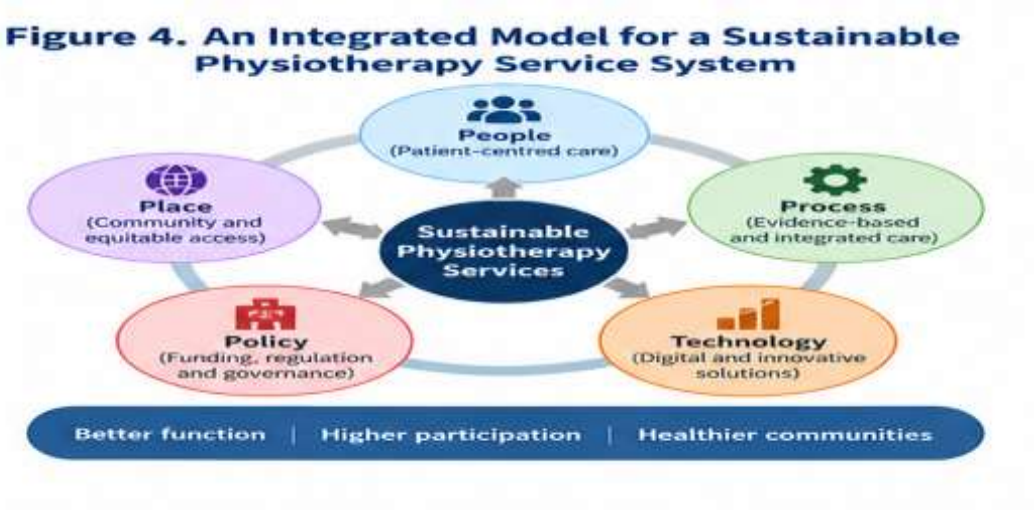


Figure 4. An Integrated Model For A Sustainable Physiotherapy Service System

Figure 4 clarifies why evidence-based interventions alone are insufficient when access, financing, workforce, policy, or local context are weak. Conversely, system expansion without professional competence and outcome monitoring risks increasing service volume without improving value. The most defensible future model therefore combines patient-centred practice, evidence-informed clinical processes, appropriate technology, enabling policy, and community-responsive delivery, supported by continuous evaluation and professional development (Novak et al., 2021; Lafrance et al., 2021; Nugraha et al., 2021).

Synthesis and Explicit Answers to the Research Questions

RQ1 asked how contemporary physiotherapy contributes to prevention, functional recovery, chronic disease management, rehabilitation, and health-system performance across populations and settings. The review indicates that its contribution is multidimensional. Physiotherapy supports prevention and physical-activity promotion; provides conservative management and triage in primary care; restores mobility and function after acute illness, surgery, or neurological injury; supports chronic disease management and self-management; reduces fall risk and functional decline in older adults; and enables

participation through community, home-based, and digital rehabilitation. At system level, direct access, advanced practice, home-based rehabilitation, and telerehabilitation can improve access and may reduce selected healthcare utilisation and costs when appropriately implemented (Cieza et al., 2020; Hon et al., 2021; Leemans et al., 2021; Seron et al., 2021). RQ2 asked which clinical, organisational, technological, ethical, and contextual factors determine whether physiotherapy can be delivered effectively, accessibly, and sustainably. The evidence indicates that clinical effectiveness depends on accurate assessment, condition-appropriate intervention, adequate therapeutic dose, progression, adherence, shared decision making, and outcome monitoring. Organisational effectiveness depends on workforce capacity, referral and escalation pathways, interprofessional collaboration, leadership, access to evidence, and service continuity. Technological effectiveness depends on infrastructure, privacy, usability, and patient selection. Ethical sustainability requires equity, competence, autonomy, and responsible allocation of limited resources. Contextual sustainability requires adaptation to geography, culture, financing arrangements, community needs, and local health-system capacity (Hoffmann et al., 2020; Kulju et al., 2020; Fryer et al., 2021; Nugraha et al., 2021).

Taken together, these findings argue against defining physiotherapy by a narrow list of techniques. Its distinctive contribution lies in using movement, exercise, education, behaviour change, functional training, and rehabilitation science within a structured clinical reasoning process that links impairment to activity, participation, and life context. This perspective provides a stronger basis for health-policy planning, professional education, and service evaluation than approaches that judge physiotherapy solely by treatment sessions or isolated modalities.

CONCLUSIONS AND RECOMMENDATIONS

Physiotherapy has evolved from a predominantly post-injury and clinic-based service into a broad rehabilitation and health-system function spanning prevention, primary care, acute recovery, chronic disease management, community rehabilitation, healthy ageing, and digital care. The evidence synthesized in this review indicates that its most consistent value lies in improving human functioning: movement, activity, independence, participation, self-management, and quality of life. This functional orientation makes physiotherapy particularly relevant as populations age and the burden of non-communicable disease, musculoskeletal disability, neurological conditions, and multimorbidity continues to increase.

The review also shows that physiotherapy effectiveness is intervention- and context-dependent. Exercise therapy, task-specific neurological rehabilitation, pulmonary rehabilitation, fall-prevention interventions, education, and selected adjunctive therapies can provide meaningful benefits when appropriately prescribed and progressed. The strongest contemporary model is therefore not modality-centred, but person-centred and goal-oriented, combining evidence-based intervention with shared decision making, therapeutic alliance, functional outcome measurement, and support for long-term self-management.

At the health-system level, direct access, first-contact physiotherapy, advanced-practice roles, community rehabilitation, home-based care, and telerehabilitation create opportunities to improve accessibility and continuity while using specialist resources more efficiently. However, these innovations are not automatically transferable across settings. Their success depends on professional competence, regulation, financing, referral and escalation pathways, interprofessional trust, digital infrastructure, and public understanding of the physiotherapist's role. Equity must remain central because expansion through digital or advanced-practice models can still exclude rural, low-income, low-literacy, or technologically underserved populations.

For Indonesia, the findings support strengthening physiotherapy within primary care, community-based rehabilitation, chronic-disease management, and hybrid service delivery while maintaining strong links to hospital and specialist rehabilitation. Existing community-based rehabilitation experience provides a useful platform, but further development requires workforce planning, regional service mapping, clearer referral systems, outcome measurement, professional development, and investment in digital and rehabilitation infrastructure. Service expansion should be accompanied by explicit attention to ethics, culturally responsive communication, and affordability.

Future research should move beyond asking whether physiotherapy works in idealised settings and examine how effective interventions can be implemented equitably at scale. Priorities include pragmatic and hybrid effectiveness-implementation studies, economic evaluations, comparative studies of direct-access and advanced-practice models, long-term analyses of home-based and digital rehabilitation, and research on workforce distribution and rehabilitation access in low- and middle-income settings. Studies should increasingly report outcomes across impairment, activity, participation, quality of life, self-management, service utilisation, and cost, while also identifying which patients benefit most from face-to-face, home-based, community, digital, or hybrid pathways. Such evidence is essential for building physiotherapy services that are clinically effective, financially responsible, ethically sound, and resilient across diverse health-system contexts.

FURTHER STUDY

This study still has limitations, so further research is needed on the topic of Physiotherapy Across the Continuum of Care: Clinical Contributions, Health-System Integration, and Sustainable Rehabilitation - A Review to improve this research and add insight for both the author and the readers. .

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